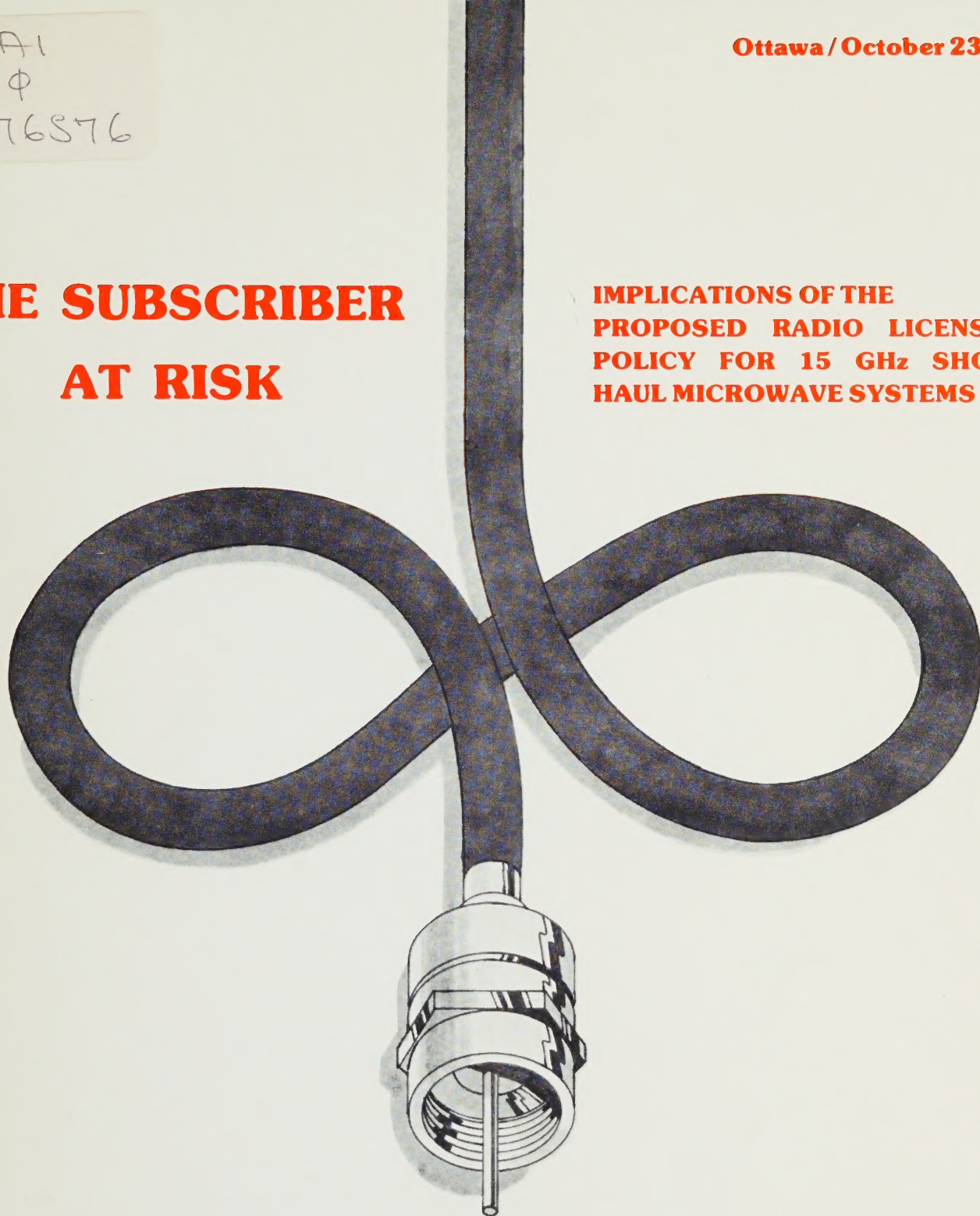


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THE SUBSCRIBER AT RISK

**IMPLICATIONS OF THE
PROPOSED RADIO LICENSING
POLICY FOR 15 GHz SHORT-
HAUL MICROWAVE SYSTEMS**



**A submission to the
Department of Communications on the Proposed Radio Licensing Policy for
Short-Haul Microwave Systems in the Band 14.5 – 15.35 GHz**

Canadian Cable Television Association
Association Canadienne de television par câble



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THE

IMPLICATIONS

OF THE

PROPOSED RADIO LICENSING POLICY

FOR

SHORT-HAUL MICROWAVE SYSTEMS IN THE BAND

14.5 - 15.35 GHz

A SUBMISSION TO THE

DEPARTMENT OF COMMUNICATIONS

FROM THE

CANADIAN CABLE TELEVISION ASSOCIATION

ASSOCIATION CANADIENNE DE TÉLÉVISION PAR CÂBLE

OTTAWA

22ND OCTOBER 1976

1. BACKGROUND

The cable television industry in Canada has achieved its position of world leader in cable television by the distribution of an ever increasing range of television, radio and other services to its subscribers by means of coaxial cable.

This very success (some ten million Canadians now watch cable television) has brought about its own problems. The coaxial cable distribution system attenuates the signals, requiring the insertion of amplifiers in the system at regular intervals. These amplifiers contribute noise to the system and are the basic limiting factor to the length of any one path in a coaxial distribution system. Many of the larger or more wide-spread Canadian cable systems have reached the limit beyond which it is difficult to provide a satisfactory quality of signal to their subscribers by conventional means. The same limitation prevents the extension of cable television service to many towns and villages surrounding currently operating systems.

Broadband short-haul microwave systems, carrying on a single radio link, all television and other services distributed by the cable licensee, is a technically elegant and economically sound method of overcoming these limitations. 12 GHz equipment suitable for such links, and the frequency allocations in which to use them, have been available in the United States for a number of years. Two major types of equipment have been developed, called respectively amplitude modulated links (AML) and frequency modulated links (FML).

This equipment has found major applications in the United States with the cable television industry to overcome the limitations outlined above.

Until late in 1974 there had been no frequency allocations in Canada for such equipment despite requests to the Department of Communications over a number of years by this Association and by members of the industry at large.

It was with enthusiasm therefore that on the 22nd of November 1974 this Association greeted the Department's proposed new policy for High Capacity Microwave at 12 GHz. This proposed new policy invited immediate applications for licenses by the cable television industry for short-haul purposes in the 12 GHz band. A large number of cable television licensees across the nation have since that time either applied for licenses, entered discussions and negotiations with the Department to do so, are in the process of doing this, or are planning such links for the future. A far smaller number of cable television systems have in fact received 12 GHz licenses to date. This Association submits however, that it is applications, negotiations and planning that indicate the extreme need for such short-haul microwave links in the Canadian cable television industry, rather than the number of licenses that have currently been issued, the latter not being fully under the control of this industry.

2. LIKELY EFFECT OF PROPOSED 15 GHz POLICY

On July 26th 1976, the Department of Communications released its new policies for licensing short-haul microwave systems. This release consisted of "The radio licensing policy for short-haul microwave systems in the band 12.7 to 12.95 GHz" and "The proposed radio licensing policy for short-haul microwave systems in the band 14.5 - 15.35 GHz".

These policies were received with consternation by the cable television industry. In short, they proposed that as of the 1st January 1978, no new licenses would be issued for short-haul microwave systems in the 12 GHz band, but from this date, systems would be licensed in the 15 GHz band. All licensees of 12 GHz systems issued up to that date, must accept as a condition of license that they may not be permitted to use the 12 GHz band beyond the 1st of January 1983. Beyond that date, licenses might be renewed on a year-to-year basis.

On the face of it this seems innocuous enough. There is however, one factor which makes this a major retrograde step for the cable television industry. THERE IS NOT AT THIS TIME ANY BROADBAND SHORT-HAUL 15 GHz MICROWAVE SYSTEMS BEING PRODUCED OR UNDER DEVELOPMENT IN CANADA OR THE UNITED STATES, (or as far as it is known, anywhere in the world). Unless such equipment is designed and developed to a reliable and usable standard in the extremely short

time scale of fourteen months, THE EFFECT OF THE TWO POLICIES IS TO PROHIBIT THE INSTALLATION OF SHORT-HAUL MICROWAVE SYSTEMS BY THE CANADIAN CABLE TELEVISION INDUSTRY AFTER THE 1st JANUARY 1978.

THIS IS UNACCEPTABLE TO THE CANADIAN CABLE TELEVISION INDUSTRY AND ITS SUBSCRIBERS.

In the working paper attached to the 15 GHz policy, the Department states ".....with a definite policy established for the use of the band 14.5 - 15.35 GHz, manufacturers would be expected to undertake the development and production of the appropriate equipment for the upper band of frequencies, (14.5 - 15.35 GHz) and within a time-frame compatible with the cut-off date specified for operation in the band 12.75 - 12.95 GHz".

This Association feels that this statement by the Department shows a complete lack of understanding of the technical planning, production and financial processes of the microwave manufacturing industry. Association discussions with various manufacturers indicate that a fourteen month time span from concept to full scale proven production for equipment comparable technically and economically with currently available AML and FML equipment is impractical to the point of being ludicrous.

Before we consider the reasoning behind the Departments two policies, let us tabulate the likely effect on the ten million Canadian cable viewers and upon the Canadian cable television industry itself,

if these policies were to be implemented prior to 15 GHz equipment being available.

EFFECTS ON CABLE TELEVISION VIEWERS

- a) Deprivation of improved service for urban and suburban subscribers.
- b) Deprivation of any cable TV service for many Canadians in rural areas.

EFFECTS ON INDUSTRY

- a) Effective doubling to tripling of cost of all 12 GHz equipment in use under all licenses withdrawn between the 1st of January 1983 and the following few years. This is caused by a shortening of the equipment lifetime from 15 years to, in the worse case, 5 years.
- b) The uncertainty of the availability of short-haul microwave for the cable television industry will have a severe negative effect on the future plans of the industry with regards to expansion, and upon the availability of finances to support such plans. In this capital intensive industry, such an aura of uncertainty reflects significantly in the financial market place.

The development and manufacture of microwave equipment is also a capital intensive undertaking. Development costs are high, and traditionally microwave manufacturers will only develop equipment for a wide market. Historically microwave communications equipment, developed for other applications in the 2, 4, 6, 8 and 12 GHz bands, has been applicable to a world-wide market. Even in this environment, the development and production of microwave communications equipment is a financially hazardous proposition, usually undertaken only by multi-national companies with wide financial backing after a great deal of market research.

In contrast to this, the proposed 15 GHz allocation for short-haul broadband microwave systems is applicable only to Canada. Comparable allocations do not exist in the United States or other parts of the world. The restriction of the market to Canada, provides yet another hazard to the development of this equipment.

As part of the research undertaken in the preparation of this submission, it was stated by a company currently manufacturing 12 GHz short-haul microwave equipment that if the development of 15 GHz broadband equipment were insisted upon the following would apply.

- a) The company requiring the equipment would be required to pay \$500,000 development cost and \$250,000 for tooling cost.

- b) After these monies had been paid, the first 15 GHz system would cost $2\frac{1}{2}$ times the cost of the equivalent 12 GHz system.
- c) The next five systems would cost twice as much as the comparable 12 GHz systems.
- d) All additional systems would cost 1.75 times the 12 GHz cost.

From these figures it would appear that if and when 15 GHz equipment does become available its costs would be prohibitive.

A further consideration is that these estimates apply only to the development of 15 GHz equipment by a company already manufacturing comparable 12 GHz equipment. Although figures have not been obtained it would seem reasonable to expect that the development of suitable equipment by Canadian companies, who have no comparable equipment on which to base their design, would be even more expensive and consequently less competitive. If this premise is accepted, a further effect of the requirement to develop 15 GHz broadband short-haul microwave equipment is likely to be that the Canadian subscriber will be called upon to pay higher subscription rates, with the funds accruing from these higher rates flowing directly to U.S. manufacturers with no advantages accruing either to the Canadian subscriber, the Canadian cable television industry or to the Canadian economy.

3. REASONING BEHIND THE NEW POLICY

It has been contended by the operators of telecommunications systems (the common carriers), that the 12.2 - 13.25 GHz band was required for long-haul terrestrial digital microwave systems as there were significant cost penalties associated with the use of higher bands.

If the ideal case is taken where the only consideration in the choice between two frequency bands for a long-haul digital microwave system is that of suitability of frequency, there can be absolutely no argument that the 12 GHz band is more suitable for such a system than the 15 GHz band. It would appear that the Department of Communications' 15 GHz policy is based upon the acceptance of the common carriers contention in the context of such an idealized situation.

UNFORTUNATELY SUCH AN IDEALIZED SITUATION DOES NOT EXIST.

There are currently users of the 12GHz band and it has been stated by the common carriers that the requirement for long-haul digital microwave systems will only exist after 1985. Our researches have shown that there is a very considerable probability that by that time there will be three economically viable alternatives to the upper 12 GHz band for long-haul digital communications systems. Let us now consider these alternatives.

4. ALTERNATIVES FOR LONG-HAUL DIGITAL COMMUNICATIONS SYSTEMS

Various Canadian common carriers have stated that there will be a requirement for a nation-wide heavy route digital communications system

by the year 1985. The researches of this Association has not revealed in the public literature any indepth justification for such a statement or detailed specification for such a system. As it is unthinkable that any responsible government body would formulate policies without such justification, the CCTA will assume that it exists and will base this section of its submission on such an assumption. Without details of the specification of such a system, it will be appreciated that alternative recommendations can only specify generalities rather than specifics.

The first intuitive thought when learning of the professed requirement for a terrestrial long-haul digital microwave system in 1985 is, "why would a terrestrial system be contemplated in Canada when there are currently three ANIK satellites in orbit, each with ten usable transponders with a current usage of eight trunk transponders out of the thirty available". On further consideration however, it must be realized that the current series of ANIK satellites have a limited lifetime and in any case do not have the optimum design parameters for such a proposed network.

As the Department's 12 GHz Policy and Proposed 15 GHz Policy are based upon the requirement for a terrestrial long-haul digital system, it was with some surprise that this Association learned that the Trans-Canada Telephone System, in conjunction with Telesat Canada, had proposed to Her Majesty's Government that a new generation of ANIK satellites be put into operation to fulfill the needs of the

common carriers. The surprise was occasioned by the fact that the proposed second generation of ANIK satellites would use the lower portion of the 12 GHz band and would be designed specifically to carry all common carrier traffic in the decade commencing 1982, on a cross-nation basis. The economics of such a system are viable using the projections of the common carriers themselves, if all traffic is carried on such a system. A representative of the TCTS informed this Association verbally that this traffic would include all heavy route digital traffic expected during that time period.

It would appear therefore that the requirement which was the basis of the Department's proposal to prohibit the licensing of short-haul microwave systems in the upper 12 GHz band, after the 1st January 1983, is already covered by an alternative proposal submitted to Her Majesty's Government by the common carriers themselves.

In the event that there were certain facts that this Association was not aware of, that negated this alternative, further alternatives were explored. At no time has any party intimated that the long-haul terrestrial digital microwave frequency allocation will be required prior to 1985. These alternatives have therefore taken into account that fact.

The study of contemporary technical literature gives the following projections for power output and noise figure for 15 GHz communications equipment. By 1984 such equipment will have a power

output 10 dB greater than that currently available, and a noise figure 2 dB lower than that currently achievable. These figures indicate that the 15 GHz long-haul equipment available at the time it is required will permit path lengths and other economies comparable with 12 GHz systems available at that time. This means that it has been authoritatively stated that by the time it is required, there will be little significant advantage in going to the 12 GHz band instead of the 15 GHz band for long-haul microwave equipment.

The results of studies by A.D. Little Inc., issued this month, show that fibre optic systems are currently competitive with T3 Systems and will soon be competitive with T2 Systems. Projections made during the study show a very high probability that long-haul broadband digital fibre optic systems with an across-the-nation capability will be in production prior to 1984. This is thus a third alternative for consideration.

5. CONCLUSIONS

The study by this Association of the Department's new policies for licensing short-haul microwave systems, together with research into the implications of the policies, and into alternatives available to the Department, have led to the following conclusions:

1. That consideration limited to one technical factor alone has led the Department to propose a policy without due consideration of its economic and sociological implications on the current occupants of the upper 12 GHz band.

2. That alternatives for the carriage of high capacity digital communications on a nation-wide basis have not received sufficient consideration.
3. That the likely reaction time of the microwave manufacturing industry in responding to the new policies with new equipment has been greatly under-calculated.
4. That the likely cost of suitable broadband short-haul microwave equipment in the 15 GHz band has not been examined in sufficient depth.
5. That implications of the policy on the Canadian cable television viewer, have not been taken into sufficient account.

6. RECOMMENDATIONS

Based upon the conclusions drawn above, this Association finds that the new policies for licensing short-haul microwave systems announced by the Department of Communications on the 26th of July 1976, are premature and are likely to have a significant deleterious effect upon the service provided to the Canadian cable television viewer, upon the Canadian cable television industry and upon the Canadian economy, without providing any off-setting advantage that could not

accrue by formulating alternative policies.

This Association therefore recommends that the proposed radio licensing policy for short-haul microwave systems in the band 14.5 - 15.35 GHz not be implemented until the concerns given in this submission be addressed. It is further recommended that the time limitations given in radio licensing policy for short-haul microwave systems in the band 12.7 - 12.95 GHz section 1, be lifted, until either suitable and cost comparable equipment is available and the VHCM equipment currently in use has reached the end of its planned lifetime, or it is decided to continue to license short-haul microwave systems in the 12.7 - 12.95 GHz band.

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